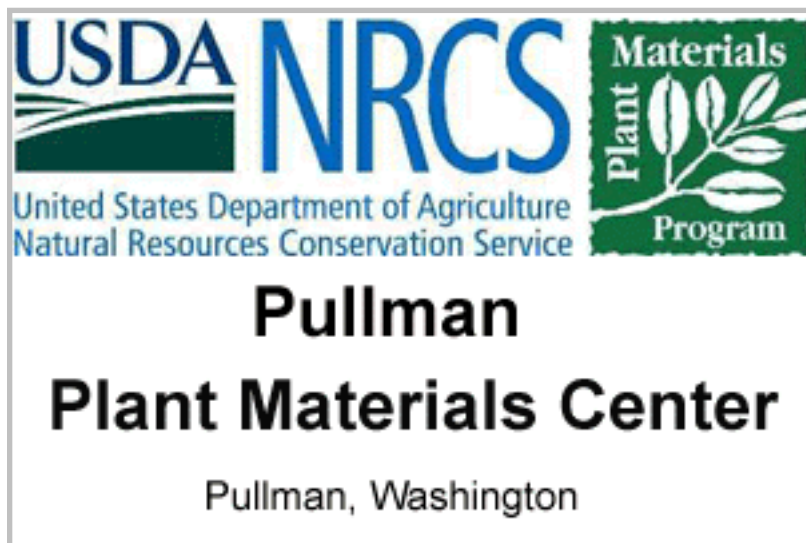


Protocol Information

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Family Scientific Name: **Fabaceae**

Family Common Name: **Legume**

Scientific Name: ***Lupinus leucophyllus* Dougl. ex Lindl.**

Common Name: **Velvet lupine, Woolly-leaf lupine**

Species Code: **LULE3**

Ecotype: **Paradise Creek drainage near Pullman, WA**

General Distribution: **Western North America east of the Cascade Mountains in southern British Columbia, Washington, and Oregon, extending into Idaho, Montana, California, Nevada, Utah, and Wyoming. In eastern Washington it is common in shrub-steppe, meadow-steppe, and open ponderosa pine forests.**

Propagation Goal: **Plants**

Propagation Method: **Seed**

Product Type: **Container (plug)**

Stock Type: **10 cu. in.**

Time To Grow: **4 Months**

Target Specifications: **Tight root plug in container.**

Propagule Collection: **Seeds are collected when the pods begin to split in July and August. Pods can be collected individually for maximum seed yield or the entire stalk may be cut. Cutting entire stalks results in collection of much immature seed. Ripening is indeterminant and the pods shatter readily when ripe. Seed collection must be done frequently. Use of Spodnam, an abscission layer inhibitor, did not appreciably reduce shattering. Seed is stored in paper bags or envelopes at room temperature until cleaned.**

There is a wide variation in size, shape, and color of the seed.

Propagule Processing: **Small amounts are crushed by hand to free the seed, then cleaned with an air column separator. Larger amounts can be cleaned with air screen equipment. 70-80% of the seed will shatter free of the pods, and 20-30% can be recovered by hammermilling before cleaning. Use of a hammermill on the shattered portion increases seed damage and is not necessary. Clean seed is stored in controlled conditions at 40 degrees Fahrenheit and 40% relative humidity.**

Pre-Planting Treatments: **The seed coat restricts water uptake and germination is increased by scarification. Seed of *L. polyphyllus* benefits from hot water scarification (Kruckeberg 1996). Some other lupine species require acid or hot water scarification while some germinate without pretreatment (Young & Young 1986). Fresh seed of *L. sericeus* germinates without pretreatment but stored seed should be hot water scarified (Mirov 1939). *L. argenteus* seed should be scarified (McDonough 1969). Romme et al (1995) found, however, that scarification increased the speed of germination but not total germination for *L. argenteus*.**

The seed is brittle and easily damaged by mechanical scarifiers. Even short times in a mechanical scarifier resulted in 77% of the seed being broken or the seed coat entirely removed. Filling the scarifier to capacity may reduce damage. Rubbing the seed by hand between two pieces of sandpaper is effective but it is difficult to control the amount of scarification. Hot water scarification is the most effective method. Water is boiled, then removed from the heat source and seed immediately placed in the hot water. It is allowed to cool for several hours, then planted. Results of trials at the Pullman Plant Materials Center showed 77% emergence by this method, compared to 45% emergence from unscarified

seed and 45% emergence from seed stratified for 30 days outdoors during the winter.

Growing Area Preparation/
Annual Practices for Perennial Crops:

Seed should be inoculated with the proper Rhizobium species prior to planting. In January scarified seed is sown in the greenhouse in 10 cu. in. Ray Leach Super cell conetainers filled with Sunshine #4 and covered lightly. Head space of ¼ to ½ inch is maintained in conetainers to allow deep watering. A thin layer of coarse grit is applied to prevent seeds from floating during watering. Conetainers are watered deeply.

Establishment Phase: Medium is kept moist until emergence occurs. Emergence usually begins in 5-6 days and continues over a period of 3-4 weeks.

Length of Establishment Phase: 4 weeks

Active Growth Phase: Plants are watered deeply every other day and fertilized once per week with a complete, water soluble fertilizer containing micro-nutrients.

Length of Active Growth Phase: 2.5-3 months

Hardening Phase: Plants are moved to the cold frame in late March or early April, depending on weather conditions. They are watered every other day if the weather is cool, and every day during hot, dry spells.

Length of Hardening Phase: 2-4 weeks

Outplanting performance on typical sites: **Transplanting is done in early May by using an electric drill and portable generator to drill 1.5 inch diameter holes at the planting site.**

Survival in seed increase plantings without competing vegetation averages 95%.

Transplanting into sites with existing vegetation reduces survival and vigor depending on weather conditions following planting.

Other Comments: **Flowering and some seed production will occur the year of transplanting and abundant seed is produced the year following transplanting. The plants are short-lived but vigorously reseed themselves. Seed is subject to insect predation and rodents will burrow into and eat the crowns, killing the plants. Some lupines can also be propagated from stem cuttings in a frame with bottom heat (Mirov 1939). Seed of *L. sericeus* maintains high germination after storage of up to 15 years in an unheated warehouse (Stevens et al 1981).**

Lupines contain poisonous alkaloids in varying amounts depending on species, plant part, maturity, and possibly ecotype. Seeds and fruits have the highest concentrations. *L. leucophyllus* is one of the more toxic species.

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